



# LAGNIAPPE

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## Cabana enters Astronaut Hall of Fame

NASA's John C. Stennis Space Center Director Robert D. Cabana joined a distinguished list of American space heroes with his induction into the U.S. Astronaut Hall of Fame at Kennedy Space Center on May 3.

With his selection, Cabana joins 69 other honored space explorers, including such pioneers as Alan Shepard, the first American in space; John Glenn, the first American to orbit the

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Former astronaut Al Worden (left) presents Stennis Space Center Director Bob Cabana with a gold medallion signifying his induction into the U.S. Astronaut Hall of Fame at Kennedy Space Center in Florida. Cabana flew four shuttle missions from 1990 to 1998, two as pilot and two as commander. He was part of a group of four astronauts inducted into the Hall of Fame during May 3 ceremonies at Kennedy Space Center.



The 400-second May 7 test of the J-2X power pack at Stennis capped off a successful initial series that provided engineers with critical information.

## J-2X power pack test series completed

NASA engineers May 8 successfully completed the first series of tests in the early development of the J-2X engine that will power the upper stages of the Ares I

and Ares V rockets, key components of NASA's Constellation Program. Ares I will launch the Orion spacecraft that will take

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## STS-123 crew shares mission highlights



Stennis Space Center Director Bob Cabana (right) hosted members of the STS-123 shuttle crew during their May 7 visit to the Mississippi facility, presenting each with a commemorative photo of a rocket engine test firing. Visiting crew members included (from left): Commander Dominic Gorie, pilot Greg Johnson, mission specialist Robert Behnken and mission specialist Michael Foreman.

From the desk of  
**Robert Cabana**  
 Director,  
 Stennis Space Center



This last month saw my induction into the Astronaut Hall of Fame down at the Kennedy Space Center. I have to admit, I was quite taken aback by the whole thing. These were my heroes up on the stage; I never dreamed I could be an astronaut, let alone a member of the hall of fame. I just wanted to fly airplanes, and one thing kind of led to another.

While I was down in Florida for the induction, Discovery rolled out to the launch pad for the STS-124 mission in the early hours of Saturday morning. Later that morning, all the astronauts and their spouses piled on the bus to go to the ceremony, and time was left in the schedule to drive by the launch pads from the early Mercury, Gemini and Apollo programs. Then, we stopped at Launch Complex 39 and were allowed to get off the bus and take the elevator up to the 195 foot level to view Discovery “up close and personal.”

I’ve maintained all my training qualifications at the Cape, and when I go down to support launches, I make a point of going to the engine shop, the Orbiter Processing Facility or the Vertical Assembly Building to visit the troops and see the hardware. So, I didn’t think seeing Discovery on the pad was going to affect me like it did.

I was overcome with emotion. So much came back to me so fast while I stood there looking at the vehicle.

There was the thrill of going into space, but more than that, I could see all the folks that brought that vehicle to the pad who made it what it was on that day, from the beginning of the program to now. I saw the redesigns that went into the solid rocket motor field joints to prevent another Challenger-type accident; I saw the leading edge of the port wing and looked at the tank to see the improvements that have gone into our foam applications to prevent another Columbia accident. At the 95-foot level, I looked at the nozzles of the main engines and thought of all the components that were tested here at Stennis to ensure they will perform perfectly later this month. I saw everyone on this NASA team that makes it all happen and their families that give so freely of their loved ones to allow them to dedicate themselves to this fantastic adventure we’re all involved in. I was truly overwhelmed.

No one accomplishes anything by themselves in this program. I feel very fortunate to have had four outstanding missions, with four outstanding crews, supported by numerous outstanding trainers, mission controllers and shuttle processors. I’m honored to be in the Astronaut Hall of Fame, but I’m more honored to have had the opportunity to work with the finest group of people anywhere for the last 23 years at NASA. Astronauts are a visible, but a very small, part of the space program, and none of us would have accomplished anything if it weren’t for all the great folks who supported us.

This truly is a special business we’re in. Thank you all for your dedication and support of our human space-flight program. You really are making a difference.

Keep charging – and Go, Discovery!



## Cabana visits Capitol Hill

On May 8, Stennis Space Center Director Bob Cabana joined leaders of nine other NASA centers to participate in the third annual NASA Center Directors’ Day on Capitol Hill in Washington, D.C. During the day, Cabana had the opportunity to update congressional members on NASA’s space exploration plans and on Stennis’ role in that work. Among others, Cabana visited with Charles Pickering (far left), Republican representative from Mississippi’s Third District, and Charles Boustany Jr. (far right), Republican representative from Louisiana’s Seventh District.

## FULFILLING NASA'S EXPLORATION MISSION

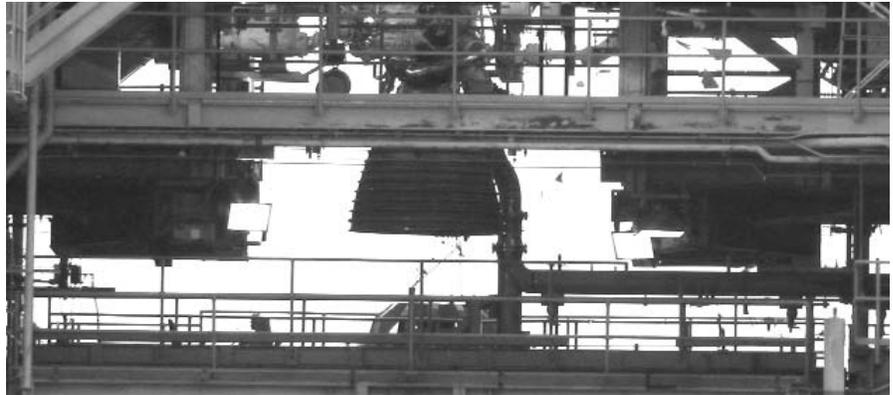
### J-2X

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astronauts to the International Space Station and then to the moon by 2020. The Ares V will carry cargo and components into orbit for trips to the moon and later to Mars.

NASA conducted nine tests of heritage J-2 engine components from December to May as part of a series designed to verify heritage J-2 performance data and explore performance boundaries. Engineers at NASA's Stennis Space Center conducted the tests on a heritage J-2 "powerpack," which, in a fully assembled engine, pumps liquid hydrogen and liquid oxygen into the engine's main combustion chamber to produce thrust. The test hardware consisted of J-2 components used from the Apollo program in the 1960s through the X-33 program of the 1990s.

"This series of tests is an important step in development of the J-2X engine," said Mike Kynard, manager of the upper stage engine for the Ares Projects at NASA's Marshall Space Flight Center in Huntsville, Ala. "We started with a number of objectives



Stennis Space Center engineers successfully completed the initial series of tests on the J-2X power pack with a 400-second firing on May 7. Now, work begins to prepare stands for another series of tests.

and questions we need answers to as we work to complete designs of the J-2X engine. The data we have gained will be invaluable as we continue the design process."

Data obtained from the tests will be used to refine the design of the J-2X pumps and other engine components to provide the additional performance required of this new engine. The J-2X engine is being designed to produce 294,000 pounds of thrust; the original J-2 produced 230,000 pounds of thrust.

The main objectives of the series were to resolve differences in heritage

turbopump performance data and recent component-level tests, and investigate vibration and pressure drops through the turbopump inlet ducts. Tests in the series ran for durations up to 400 seconds and at power levels up to 274,000 pounds of thrust.

After the data from the test series has been reviewed and objectives met, Stennis will begin readying the test stand for the next series of tests, said Gary Benton, the J-2X project manager at Stennis.

Video of the final test will be available on NASA Television's Video File. Visit: <http://www.nasa.gov/ntv>.

## Discovery rolls to launch pad for STS-124 mission

Space shuttle Discovery made the long, slow trek out to Launch Pad 39A at NASA's Kennedy Space Center on May 3, one of the last major milestones leading up to the targeted May 31 launch. Carried by the slow-moving crawler-transporter, the shuttle assembly atop the mobile launcher platform made the 3.4-mile journey at Kennedy in a little more than six hours. The scheduled STS-124 mission includes delivering the tour-bus-sized Japanese Experiment Module-Pressurized Module and the lab's robotic arm system.



# 'Fire in the bucket' – Stennis

It was early morning – just after 7:30 – on April 23, 1966. A heavy mist clung to the ground. A voice was heard counting down – 5, 4, 3, 2, 1 ... Ignition!

Suddenly, a loud sound – described by some as a “crack” – broke the morning silence. A bright blast of color overpowered the mist – an explosion of flame that lit up the early morning.

“We have fire in the bucket!” someone shouted.

The space age had arrived in a most unlikely place – the lowlands of southern Mississippi, near the banks of the meandering East Pearl River. And for a nation struggling to gain its footing in the modern technological world, it came just in time. But no one would have predicted such a development a few years earlier.

Russia's launch of the world's first artificial satellite into space signaled the start of a frenetic space race. Suddenly, travel beyond the gravitational pull of this planet was a possibility, not just fodder for Buck Rogers comic books.

American leaders responded by establishing the National Aeronautics and Space Administration in 1958. Three years later, President John F. Kennedy set forth an unimaginable dream for the nation – for humans to safely travel to the moon and back by the end of the decade.

The race to the moon had begun.

There was a lot of groundwork to be done, including the selection of various sites to implement a space program. By early fall of 1961, NASA officials had chosen three of the four needed locations – a launch site in Cape Canaveral, Fla., a manufacturing site near New Orleans and a spaceflight laboratory site in Houston.

All that remained was the selection of a site for testing the new powerful rocket engines that would be needed to propel astronauts 238,000 miles to the surface of the moon.

There were several criteria to consider, such as proximity to river navigation and isolation from populated areas. It



came down to six sites – all of which were visited by a committee of decision makers. NASA officials settled on a relatively unknown area in western Hancock County, Miss., not far inland from the Gulf of Mexico – an area not too much removed from its swampy, uninhabited natural state.

In the past, the area had been populated by Indians, pirates and soldiers. At the time of the site selection, there were a few small sawmill towns that occupied the area. However, by the 1960s, the lumber industry had declined – and the towns of Santa Rosa, Westonia, Napoleon, Gainesville and Logtown were suffering. Now, the government needed this land for a new purpose, a national purpose. For a year, the U.S. Army Corps of Engineers negotiated with residents and land owners, relocating the area population.

By May 1963, 138,000 acres of land had been acquired. Of the total, 13,000 acres were deemed necessary for actual testing facilities. The rest of the surrounding acreage was a practical acquisition – to buffer the surrounding community from the noise and potential hazards of firing the huge rocket boosters.

Finally, as summer descended on the region in 1963, trees in the area were once again cut down, but this time for a new reason – to make room for the modern age.

The work began with difficulties and a tight schedule. In 1963, a record manifestation of mosquitoes plagued the first workers at the site. In 1964, torrential rains delayed progress. A new year dawned in 1965 amid concerns that the initial schedule could not be kept. Indeed, time was running out for America to reach its moon goal. Test stands still had to be completed for test firing the Saturn V rockets to be used in the Apollo program. Canals still had to be dug. Facilities still had to be built.

The work was comprehensive – leading to the creation of 9,000 jobs with an annual generated income of \$65 million for the surrounding communities. NASA officials poured personnel into the area and even sent famed rocket pioneer Wernher von Braun to lead the charge to completion.

Von Braun understood the critical nature of the work. "It will be at the S-II stand now under construction that (the Saturn V second-stage) will receive its only full-duration firing before a lunar mission," he told workers in late 1964.



A massive S-II-T Saturn rocket booster for testing on what now is the A-2

# plays key role in moon race

"If our program slips one year, it would cost \$1 billion. This kind of money is not available ... just for the asking."

In other words, this was it. A delay would cost dearly and could mean the nation would lose the race to the moon.

The pace turned frantic. Soon, more than 6,100 persons were on site. Nearly one-fourth of them worked for General Electric in technical and base-support functions. North American Aviation and the Boeing Co. also were on site. The three companies were the largest among 30 prime

and 250 sub-prime contracting agencies working to meet the 1965 deadlines, even as NASA officials were upping the ante.

Mid-summer, they announced a truly ambitious goal – the first real test fire on Jan. 2, 1966. Two months later, Hurricane Betsy roared ashore in the area, slamming the Gulf Coast region, killing 76 and gaining notoriety as "Billion Dollar Betsy," the first \$1 billion natural disaster in American history. Betsy did not damage the new test site but it wrecked work schedules as personnel and equipment ended up scattered throughout the area to escape the storm.

However, workers regrouped—and persevered. Crews labored desperately to complete the test stands, while engineers finished designing a canal-and-lock system that would enable them to barge the rocket engines from the Michoud Assembly Facility in nearby New Orleans, through the Intracoastal Waterway, across a stretch of

the Gulf of Mexico, up the Pearl River and right to the foot of the test stand. To do so required deep canals and a lock system for raising the barges as much as 20 feet from the level of the Pearl River.

The workers and engineers did not meet the Jan. 2 test date. But it was just a few months later that success was achieved with the first test of a Saturn rocket stage on April 23, 1966.

Less than a year later, when a Saturn V first-stage booster was fired for the first time, the noise and blast from the most powerful rocket ever built in America shattered a bank window in nearby Picayune. It also shattered any doubt that the site – then known as the Mississippi Test Facility – was prepared to fulfill its mission.

Overall, the Mississippi site was used to conduct a range of

Saturn rocket tests. The hard work paid off on Oct. 11, 1968, when three astronauts on NASA's Apollo 7 mission made the first manned orbital flight aboard a craft whose engines had been tested at the Mississippi site.

Eight months later, on July 20, 1969, Kennedy's dream became a reality, as astronaut Neil Armstrong became the first human to set foot on the moon. Six more moon missions would be conducted before the Apollo program ended in the 1970s.

For the Mississippi Test Facility, that ushered in a time of change as its facilities were modified to test engines for NASA's new launch vehicle, the space shuttle. Testing space shuttle main engines has remained the primary business of what is now Stennis Space Center. However, in 2004, President George W. Bush announced a new vision for NASA, which called for the space shuttle to be retired by 2010 and astronauts to return to the moon by 2020.

In 2006, one of the historic test stands at Stennis was modified again, to test the J-2X engine that will be used for the next stage of America's space program.

So now, 50 years after the national space program began, the section of Mississippi lowlands now known as Stennis Space Center has grown into the America's largest rocket engine test facility. And 42 years after the first "fire in the bucket" was ignited, the site continues to fulfill its overriding mission of ushering in the future of space exploration.



Stage is installed on Nov. 18, 1965  
Test Stand at Stennis.



April 23, 1966 – the first static firing of a Saturn S-II-T booster stage at Stennis.

## Cabana

*Continued from Page 1*

Earth; Neil Armstrong, the first human to set foot on the moon; and Sally Ride, the first American woman in space. Cabana was one of four astronauts inducted this year and was in the seventh group of space shuttle astronauts to be named to the Hall of Fame. Hall of Fame members also represent the Mercury, Gemini, Apollo, Skylab and Apollo-Soyuz space programs.

“I feel very lucky to have had four outstanding missions, with four outstanding crews, supported by numerous outstanding trainers, mission controllers and shuttle processors” said Cabana. “I’m honored to have this

recognition, but I’m more honored to have had the opportunity to work with the finest group of people anywhere for the last 23 years at NASA. Astronauts are very visible, but a very small part of the space program. I wouldn’t be receiving this recognition if it wasn’t for all the great folks who supported me.”

Cabana piloted Space Shuttle Discovery on missions STS-41 in 1990 and STS-53 in 1992. He commanded Columbia’s STS-65 mission in 1994, during which the crew conducted microgravity research experiments that helped pave the way for future operations aboard the International Space Station (ISS). His final flight was in 1998 as commander of space shuttle Endeavour



Bob Cabana addresses guests at a recent Stennis Space Center reception in honor of his induction into the Astronaut Hall of Fame.

on STS-88, the first ISS assembly mission.

The U.S. Astronaut Hall of Fame opened in 1990 at Kennedy Space Center in Florida. It features a vari-

ety of exhibits, including an interactive space adventure, the world’s largest collection of astronaut artifacts and memorabilia and realistic astronaut training simulators.



## Stennis marks Earth Day

Jenette Gordon, a member of the environmental management staff at Stennis Space Center, attaches her name to display tree during Earth Day activities last month. A name later was selected from the tree to win a prize of environmental-friendly items. During Earth Day activities, Stennis employees had the opportunity to visit various displays featuring items and advice on how to live more eco-friendly. They also were asked to pledge to take at least one specific action to help the environment.

## NESC Academy visits Stennis



NASA Engineering and Safety Center Academy students visited Stennis Space Center on May 7. During the visit, the students from various NASA sites heard a presentation from SSC Deputy Director Gene Goldman and toured the facility, including the A-2 Test Stand. The students were participating in the NESC Academy course “Learning from the Past, Looking to the Future.” NESC offers a variety of courses on space-related topics. Above, students and instructors George Hopson and Lynn Worlund stand in front of the flame bucket at the A-2 Test Stand.

# Memorial Day – remember fallen heroes

Memorial Day is a U.S. federal holiday that is observed on the last Monday of May. This holiday commemorates U.S. men and women who have died in military service to their country. Since 1776, no generation of Americans has been spared the responsibility of defending freedom by force of arms. Forty million American men and women have answered the call to duty, more than 1 million sacrificing their lives in the belief that some principles are worth fighting ... and dying to preserve. The National Moment of Remembrance asks Americans wherever they are at 3 p.m. on Memorial Day to pause in an act of national unity to remember our fallen heroes.

**The Unknown Soldier.** More than 1 million American men and women have given their lives in the defense of freedom. For those whose names we do not know, the unknown soldiers of World War I, World War II, Korea and Vietnam serve as a somber reminder of freedom's cost.

The Tomb of the Unknown Soldiers at Arlington National Cemetery in Arlington Va., has never been officially named. The monument is dedicated to the U.S. servicemen who have died without their remains being identified.

**The Unknown Soldier of WWI.** In 1921, four unknown soldiers were exhumed from WWI American cemeteries in

France. Sgt. Edward Younger, wounded in combat and recipient of the Distinguished Service Medal for his service, selected one soldier from four identical caskets.

**The Unknown Soldiers of WWII and Korea.** Two unknown soldiers from WWII were placed in identical caskets and taken aboard the USS Canberra. Navy 1st Class Charette, then the Navy's only active-duty Medal of Honor recipient, selected the Unknown Soldier of WWII. (The remaining casket received a solemn burial at sea). Four unknown Americans who died in the Korean War were disinterred from the National Cemetery in Hawaii. Master Sgt. Lyle made one selection from the four caskets. Both WWI and Korean unknown soldier caskets arrived stateside where

President Eisenhower awarded two Medals of Honor. They then were interred beside their WWI comrades.

**The Unknown Soldier of Vietnam.** The unknown soldier from the Vietnam War was designated by Medal of Honor recipient U.S. Marine Corps Sgt Kellogg Jr. in 1984. The Vietnam unknown was transported to Arlington where President Reagan presided over the funeral and presented the Medal of Honor. (In 1998, DNA testing identified the exhumed remains as those of Air Force 1st Lt. Blassie. They were returned to his family in Missouri.)

From the  
**Office of  
Diversity  
and Equal  
Opportunity**



## Holocaust Memorial program

U.S. Navy Rear Admiral Dave Titley (left) and Stennis Space Center Director Bob Cabana (right) stand with Mark Wygoda, a professor at McNeese State University in Lake Charles, La., and featured speaker at the May 6 Holocaust memorial gathering at Stennis. For the first time, the Days of Remembrance of the Victims of the Holocaust service was a joint venture of the U.S. Navy and NASA. During the observance, Wygoda told the story of his father, Hermann, a Polish Jew who became a leader in the Italian Resistance Army. After the war, Hermann Wygoda was recognized by several countries, including the United States, for his efforts against the Nazis.

## This Month in NASA History

Forty-five years ago, on May 15, 1963, NASA launched its Faith 7 capsule on the Mercury-Atlas 9 mission from Cape Canaveral, Fla. The Faith 7 capsule carried astronaut Leroy Gordon Cooper and orbited the Earth a total of 22 times. This mission was the first United States space flight to exceed 24 hours and represented the last Mercury mission.



## Hail & Farewell

### NASA bids farewell to the following:

- Linda Theobald**      Lead, Public Affairs Officer  
Office of External Affairs & Education
- Susan McDonald**      Computer Specialist  
Center Operations Specialist

### And welcomes the following:

- Marvin Horne**      Contract Specialist  
Office of Procurement
- Carol West**      Contract Specialist  
Office of Procurement

# Mississippi Economic Council annual meeting



NASA and space exploration were front and center at the Mississippi Economic Council annual meeting in Jackson on May 7. Apollo 13 astronaut Fred Haise (left) of Mississippi was keynote speaker. Stennis Space Center also provided a NASA 50th anniversary exhibit for participants. At right, Linda Whittington of Raymond, Miss., views an exhibit timeline.



## FIRST Robotics

In March, Gulfport High School's robotics team (Team Fusion at left) won the prestigious Chairman's Award at the Bayou Regional in New Orleans. In April, the team competed in the international championships in Atlanta and placed in the top fourth of their division. NASA provides sponsorship and engineering mentors to Team Fusion and other local robotics teams. SSC Team Fusion mentors include Bo Clarke (NASA), Brennan Sanders (NASA), James Cluff (NSSC), and Jack Higgs (SAIC).

## Students stress science at FMA Live

School principals participate in a sumo wrestling match during the "FMA Live!" presentation at Mississippi State University in Starkville, Miss., on April 4. Some 1,660 students from 10 northwest Mississippi schools attended the event. "FMA Live!" is a production that was formed from a NASA- Honeywell partnership. Its purpose is to reinforce Newton's Three Laws of Motion. In this picture, the principals demonstrate Newton's third law of motion – "For every action, there is an equal and opposite reaction."



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